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GB 2143720 A GB 2113977 A WO 87/04061 A1
WO 86/01090 A1 US 4202139 A

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(71) Applicant
Minnesota Mining and Manufacturing Company

(Incorporated in the USA - Delaware)

PO Box 33427, 3M Center, Saint Paul,
Minnesota 55144-1000, United States of America

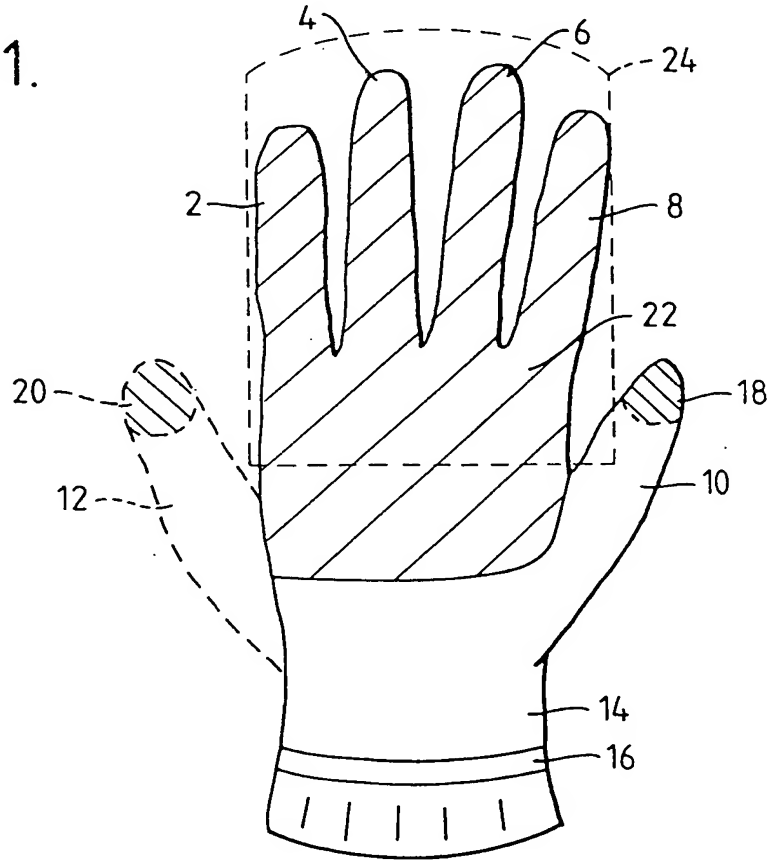
(72) Inventor
Barry Stone

(74) Agent and/or Address for Service
Lloyd Wise, Tregear & Co
Norman House, 105-109 Strand, London, WC2R 0AE,
United Kingdom

(54) Abrasive glove

(57) A protective glove having releasably attached on a portion of its outer surface (22) a pad (24) of a resiliently compressible material having a thickness of at least 1mm (preferably in the range of 2 to 15mm) and an abrasive mat rial releasably attached to the pad.

Fig. 1.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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Fig. 1.

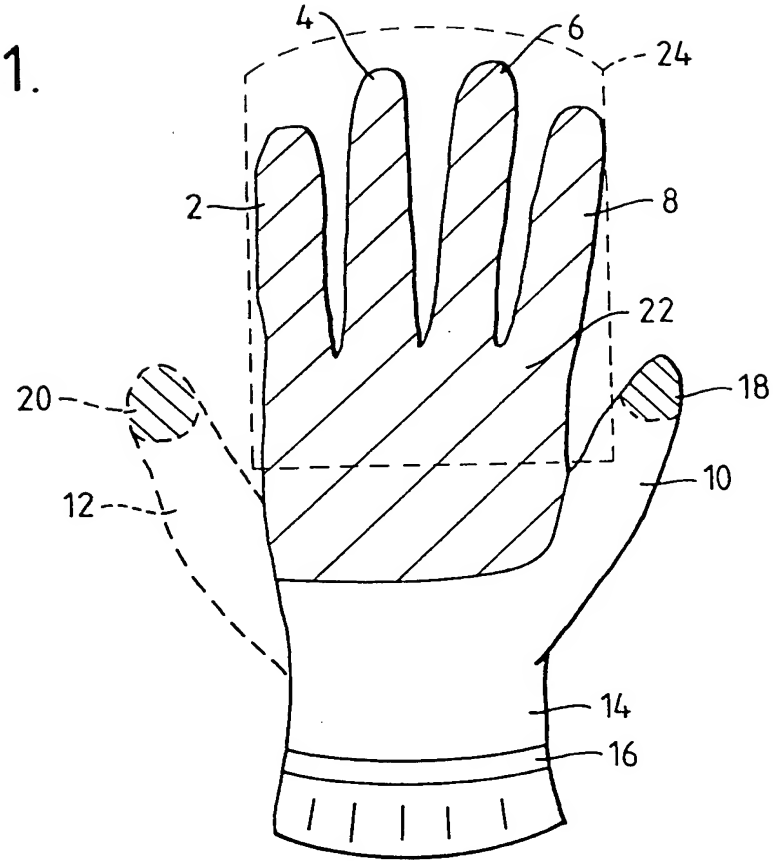
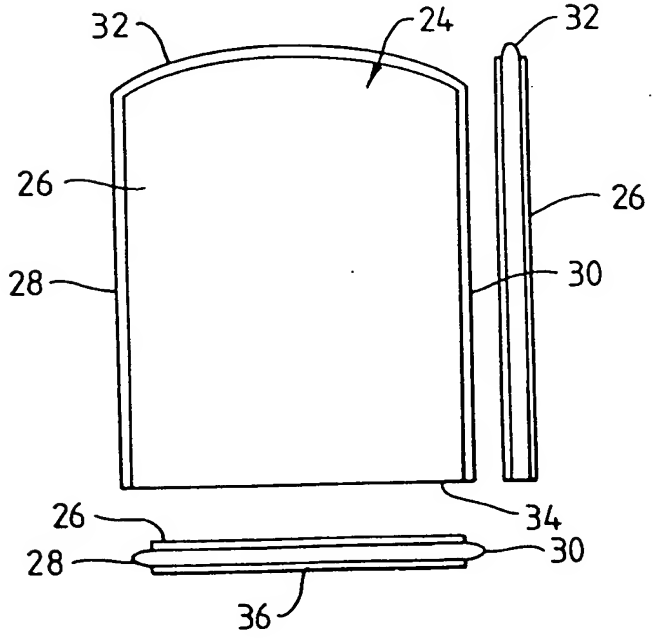


Fig. 2.



ABRASIVE GLOVE

This invention relates to a glove to which is releasably attached an abrasive material.

When hand-sanding using a flexible sheet of abrasive, it is customary either to hold the abrasive sheet directly in the hand or to wrap it round a suitable block of rubber, cork, wood etc. Neither approach is satisfactory, because in both cases fatigue sets in rapidly due to the effort expended in holding the abrasive in the correct position. Both methods leave the hand exposed to injury by contact with the abrasive or the workpiece, unless a protective glove is worn, but this makes it even more difficult to hold the paper properly. When using a block, there is inefficient use of the available abrasive surface, and difficulty in sanding curved or irregular surfaces. A problem encountered when no block is used is an uneven finish caused by uneven finger pressure. There have been several attempts to solve these problems, but none has been fully successful.

Various gloves have been described having abrasive grit adhered directly to the outer surface e.g. U.S. Patent Nos. 203,959, 1,346,683, 2,459,985 and 4,038,787. These gloves disclosed do not address the problem of uneven finger pressure and have generally been advocated for applications such as scouring pans, scrubbing vegetables etc. U.S. Patent No. 3,789,555 also describes a glove whose outer surface is coated with abrasive grit. In one embodiment, the abrasive is in the form of a sheet releasably adhered to the glove surface by pressure-sensitive adhesive, but the sheet effectively covers the entire palm and finger area. This is again an inefficient use of the abrasive, and since the glove does not contain pad cushioning material beneath the abrasive the problem of uneven finger pressure remains.

French Patent Specification No. 2588728 discloses a glove and abrasive material having co-operating fastening means which allows the abrasive to be removably secured to the glove.

British Patent Specification No. 2224634 discloses a household or industrial glove of rubber, plastics or rubber-like material provided with pads of flexible waterproof cleaning material.

British Patent Specification No. 2143720A discloses a glove for cleaning, smoothing and/or polishing objects to selected surfaces of which abrasive materials are secured permanently or releasably for removal purposes when worn.

British Patent Specification No. 2078091 discloses an abrasive cover for wearing on at least a portion of the hand. The cover may be in the form of a glove, mitten, finger stall etc., and possesses abrasive on the exterior surface.

Swiss Patent No. 650,441 discloses a glove to which an abrasive sheet is releasably attached. Mechanical fastening means e.g. protrusions comprising small hooks or small mushroom heads are provided at various points on the glove surface which may engage with a looped material laminated to the back of an abrasive sheet, or which is an integral part of a non-woven abrasive. The abrasive is shown as extending over an area greater than the area of the palm and fingers of the glove and again there is no disclosure of a pad or other cushioning material.

U.S. Patent No. 4,202,139 discloses a hand-sanding device comprising a conformable, self-supporting pad which has one major surface capable of providing temporary adhesive attachment for a sheet of pressure-sensitive adhesive coated abrasive material. The opposite major surface has a handle means for maintaining the pad in contact with the user's hand. The preferred construction of the pad incorporates a layer of foam

rubber. NicSand Inc. of Cleveland, Ohio, United States of America have marketed a similar device wherein the abrasive sheet is temporarily attached via a hook and loop arrangement. These devices address the problems of conformability and uneven finger-pressure and provide some protection to the hand.

According to the present invention there is provided a protective glove having releasably attached on a portion of its outer surface one or more pieces of abrasive material characterised in that there is a layer having a thickness of at least 1mm of a resiliently compressible material between the abrasive surface of the abrasive material and the inner surface of the glove.

The glove of the invention offers complete protection to the hand while sanding is in progress and transfers the effort required to hold and control the abrasive to the user's wrist and arm, allowing the hand itself to be kept in a relatively relaxed condition. As well as increasing the protection afforded to the hand, the layer of resiliently compressible material enables the abrasive to conform to irregular surfaces and evens out the pressure applied by individual fingers.

The abrasive material is releasably attached to the glove so that it may be easily removed after use e.g. by peeling, but adheres strongly enough not to be dislodged by the sanding process. The attachment means commonly used for abrasive discs on rotary sanders are suitable. These include pressure-sensitive adhesives and hook-and-loop materials of the "Velcro"(RTM) and "Scotchmate" type. Hook-and-loop attachment is preferred in the present invention and most conveniently the abrasive material is provided with a layer of looped material on its underside which releasably engages with hooks on the attachment surface(s) of the glove. Alternatively, the abrasive sheet may be of the non-woven type e.g. "Scotchbrite"(RTM)

type, which is inherently capable of engagement with the hooks.

The glove may be a mitten or more preferably have individual fingers, but most preferably is a hybrid of the two, in which the fingers are secured together the thumb being left free. This arrangement is found to give maximum comfort and control. The glove may be made of any suitable materials such as cotton, leather or synthetic fabrics, depending on the type or work involved. For example, if wet sanding is to be carried out, a waterproof fabric or finish is necessary. For dry sanding, a lightweight fabric, optionally with ventilation holes, may be preferable. The glove may be provided with any of the known fastening and/or adjusting means, such as straps, buckles, studs, elasticated portions etc.

In many situations, it is desirable for the operator to be able to work on as large an area as possible without moving his position e.g. when working from a ladder or scaffolding tower. This can be achieved by arranging for the glove to be interchangeable between the left and right hands, preferably without the necessity to turn it over. This is possible by providing the glove with a thumb at either side. Both thumbs may be provided with a patch of hooked material so that the unused thumb may be folded over the back of the hand and attached to a suitably positioned patch of looped material, thereby preventing the unused thumb from getting in the way and also serving to adjust the fit of the glove.

An essential feature of the invention is a layer of resiliently compressible material interposed between the user's hand and the abrasive sheet. As stated previously, this serves to aid conformability, even out the pressure and increase comfort.

Useful materials include solid rubber sheets or sheets of open or closed cell foam rubber formed of natural rubber, silicone rubber, neoprene, nitrile rubber, SBR rubber, vinyl rubber, epichlorohydrin rubber, ethylene propylene diene terpolymer rubber, polyurethane rubber and the like, open or closed cell foams of synthetic polymer such as polyurethane, polyether, polyester and co-polymers of such polymers, sheets of reticulated material formed of thermoplastic materials such as polyvinyl chloride, polypropylene, polystyrene and the like, non-woven fabrics which may be formed of adhesively bonded staple fibers or of mechanically integrated fibers, e.g., felt, woven or knit fabrics, embossed-surfaced plastic material such as embossed films of polyvinyl chloride, polyurethane, polyethylene, polypropylene, natural sheet goods such as leather and laminations of one or more of the above. The preferred cushioning material is foam rubber or a synthetic polymer foam such as polyurethane foam, polyether foam, polyester foam etc.

In one embodiment of the invention the layer of resiliently compressible material is present as an integral layer within the glove i.e. the glove is padded. The layer is preferably present over the front of the finger portions and palm of the glove, although it may also extend over the back of the glove. The padded layer is at least 1mm in thickness, preferably at least 2mm in thickness, generally in the range 2 to 10mm.

In a preferred embodiment of the invention the resiliently compressible material is in the form of a pad which is attached, more preferably releasably attached, to the outer surface of the glove. The pad preferably extends over the finger and palm portion of the glove and may optionally extend over the tips of the fingers and at least partially over the back of the fingers. In a particularly preferred embodiment the resiliently

compressible material is in the form of a pad which can be releasably attached to the glove and extends from the palm to just beyond the tips of the fingers. The pad preferably has parallel sides, a straight end orthogonal to the parallel sides and a curved end. The thickness of the pad is preferably in the range 2 to 10mm, more preferably about 5mm. The edges of the pad are preferably curved with the exception of the straight edge which is planar. Preferably, the abrasive sheet may be releasible attached to such a pad and may extend over the curved edges. Thus, by suitable positioning of the pad on the glove it is possible to efficiently sand planar and curved surfaces enabling the abrasive sheet to sand in to recesses and corners.

The glove is preferably equipped with one or more patches of looped fabric and the pad of resiliently compressible material provided with a layer of protrusions such as hooks or mushroom heads which may be detachably engaged with the looped fabric. Thus, the pad may be moved to different parts of the glove for maximum comfort and convenience. The other side of the resiliently compressible pad may be provided with a similar attachment for co-operating with an abrasive sheet, or may comprise a smooth surface for receiving an abrasive sheet having a pressure-sensitive adhesive.

It will be appreciated that the glove and pad combination may be modified to suit a variety of applications. For example, a glove may have a pad positioned on the front and back of the finger section and a single piece of abrasive sheet may be attached to both pads by wrapping around the finger tips or the side of the hand. This configuration allows slots, grooves or other indentations in the workpiece to be sanded. In another embodiment the pad may extend around one or two fingers and the abrasive sheet wrapped around the

finger(s) to enable the surfaces defining apertures to be sanded.

The invention will now be described with reference to the accompanying drawings in which:

Figure 1 represents a glove and pad combination in accordance with the invention, and

Figure 2 represents plan and edge views of the pad of Figure 1.

The glove comprises finger portions (2, 4, 6, 8), two thumb portions (10, 12) and a wrist portion (14) having adjustment means (16) e.g. in the form of an elasticated strip, tie, etc. The presence of the two thumb portions (10, 12) allows the glove to be used on the left or right hand. The rear of each thumb portion has secured to its surface one portion of hook-and-loop fastening (18, 20) which may be secured to the other portion of the fastening means positioned on the back of the glove (not shown) in order that the thumb portion which is not in use may be folded behind the glove and secured so that it does not get in the way of the sanding operation. Adjacent finger portions (2, 4, 6, 8) may be secured to each other throughout their length.

The palm of the glove and front of the finger portions (2, 4, 6, 8) is covered with an attachment surface (the shaded area shown by 22) which preferably comprises one portion of a hook-and-loop fastener. A pad shown in dotted outline at (24) has a corresponding attachment surface (26, Figure 2) to the surface (22) on the glove and is releasably secured thereto. The pad (24) is dimensioned so that one end is positioned comfortably on the palm area of the glove allowing the heel of the thumb to abut the end and the other end of the pad extends slightly beyond the fingertips.

A preferred configuration of the pad is shown in Figure 2, the pad having parallel sides (28, 30) a curved end (32) and a straight end (34). The edges (26, 28) and end (32) preferably has a curved profile such that an

abrasive sheet may be wrapped around the curve thereby providing a contoured abrasive surface suitable for sanding channels and curved surfaces. The end (34) has an edge which is normal to the major surface of the pad which enables a surface to be sanded completely into corners and upto adjoining surfaces. It will be appreciated the pad may readily be detached and repositioned on the glove in order to place the desired edge or end in the most appropriate position for the particular task.

The pad additionally comprises an attachment surface (36) on which an abrasive sheet (not shown) is secured. The attachment surface (36) may be a plain surface allowing attachment of an abrasive sheet having a pressure-sensitive adhesive backing or the attachment surface (36) may comprise one portion of a hook-and-loop fastening system for use with abrasive sheet material having a backing of the corresponding portion of the fastening system. Preferably the attachment surface (36) comprises a series of protrusions e.g. hooks or mushroom heads, for use with abrasive sheet material having a backing of looped fabric or open cell foam. Whilst it is preferred that the pad (24) allows releasable attachment of abrasive sheet material since this facilitates the use of different grades of material, such a surface (36) is not essential and the pad (24) may be formed with an integral coating of abrasive sheet material.

The pad preferably comprises a foam of rubber or synthetic polymer such as polyurethane foam, polyethylene foam, polyester foam etc. The pad preferably has a thickness in the range 2 to 15mm, more preferably in the range 5 to 10mm. The softness and flexibility of the foam will be selected depending upon the particular job and it is convenient to have a range of pads of different sizes, thicknesses and stiffness. Generally, suitable foams have a density in the range 25 to 200kg/m^3.

CLAIMS

1. A protective glove having releasably attached on a portion of its outer surface one or more pieces of abrasive material characterised in that there is a layer having a thickness of at least 1mm of a resiliently compressible material between the abrasive surface of the abrasive material and the inner surface of the glove.

2. A protective glove in which the layer of resiliently compressible material is in the form of a pad.

3. A protective glove as claimed in Claim 2 in which the pad is releasably attached to the glove.

4. A protective glove as claimed in Claim 3 in which the abrasive material is releasably attached to the pad.

5. A protective glove as claimed in any preceding Claim in which the layer or pad has a thickness of from 2 to 15mm.

6. A protective glove as claimed in Claim 5 in which the layer or pad has a thickness of about 5mm.

7. A protective glove as claimed in any preceding Claim in which the resiliently compressible material comprises a foam of rubber or a synthetic polymer.

8. A protective glove as claimed in any preceding Claim in which the layer is in the form of a pad extending from the palm of the glove over the front of the fingers.

9. A protective glove as claimed in Claim 8 in which the pad has parallel sides, a curved end and a straight end.

10. A protective glove as claimed in Claim 9 in which the edges of the parallel sides and optionally the curved end have a curved configuration.

11. A protective glove as claimed in any preceding Claim in which the glove comprises two thumb portions enabling the glove to be worn on a right or left hand.

12. A protective glove as claimed in Claim 11 in which each thumb portion may be folded and releasably secured to the back of the glove.

13. A protective glove substantially as herein described with reference to the accompanying drawings.

Amendments to the claims hav be n filed as follows

1. A protective glove having releasably attached on a portion of its outer surface a pad of a resiliently compressible material having a thickness of at least 1mm and an abrasive material releasably attached to the pad.

2. A protective glove as claimed in any preceding Claim in which the pad has a thickness of from 2 to 15mm.

3. A protective glove as claimed in Claim 2 in which the pad has a thickness of about 5mm.

4. A protective glove as claimed in any preceding Claim in which the resiliently compressible material comprises a foam of rubber or a synthetic polymer.

5. A protective glove as claimed in any preceding Claim in which the pad extends from the palm of the glove over the front of the fingers.

6. A protective glove as claimed in Claim 5 in which the pad has parallel sides, a curved end and a straight end.

7. A protective glove as claimed in Claim 6 in which the edges of the parallel sides and optionally the curved end have a curved configuration.

8. A protective glove as claimed in any preceding Claim in which the glove comprises two thumb portions enabling the glove to be worn on a right or left hand.

9. A protective glove as claimed in Claim 8 in which each thumb portion may be folded and releasably secured to the back of the glove.

10. A protective glove substantially as herein described with reference to the accompanying drawings.

-11-

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

9122957.5

Relevant Technical fields

(i) UK Cl (Edition K) A3V

(ii) Int Cl (Edition 5) A41D

Search Examiner

D BUCKLEY

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

14.1.92

Documents considered relevant following a search in respect of claims 1 TO 13

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2143720 A (MOORE) lines 51 to 71 of page 2	1 to 4 7 and 8 at least
X	GB 2113977 A (SMITH) whole document but see especially figures 5 to 8 and lines 51 to 60 of page 1	1 to 10
X	WO 87/04061 A1 (McLEISH) see eg lines 26 to 40 of page 1	1 to 4 and 7 to 9
X	WO 86/01090 A1 (KATO PRODUCTS) see foam layer 30 and eg the paragraph bridging pages 8 and 9	1 to 4 and 7
X	US 4202139 (HONG ET AL) see eg Claim 5	1 to 8

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Category	Identity of document and relevant passages	Relevant to claim(s.

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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